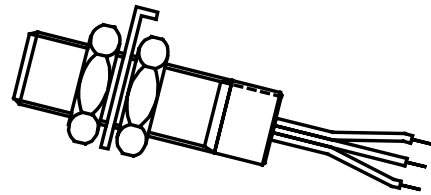


Ferrostat Differential Speed Probe Series FTG 1088.XX and Ex-approved Types (atex)

FTG 1088.XX

343E-63725

Operating instructions



General

Function	The ferrostat differential sensors FTG 1088.XX are suitable, in conjunction with a pole wheel , for generating square wave signals proportional to rotary speeds. They have a dynamic behaviour, so that pulse generation is guaranteed down to a speed corresponding to a frequency of 5 Hz. The sensing element consists of a magnetically biased hall effect semiconductor in a bridge-circuit, followed by a Schmitt-trigger. This latter has an open collector output connected with the positive pole of the power supply through a 1.8k resistor.
Safety Notice	Sensor types FTG 1088.XX Ex are certified for applications in areas with explosive atmospheres. These types are to be duly used, undamaged and clean. No modifications are allowed on the sensors if not expressly listed in these operating instructions.
Conformity to Standards	Sensor types FTG 1088.XX Ex comply with the requirements of EN 50014:1997, EN 50020:1994 and EN 1127-1:1997. They have been designed, manufactured and tested according to the state of the art. For their application the restrictions listed in the European Certificate of Conformity ZELM 00 ATEX 0147X must be observed!

Technical Data

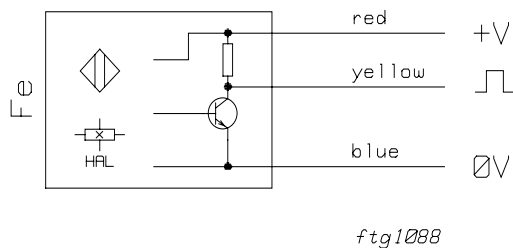
Power supply	5V $\pm$ 10%, max. allowed 12V, protected against false polarity
Current consumption	max. 16mA
Signal output	square wave voltage, mark-space approx. 1:1, DC-coupled with power source, signal-amplitude corresponding to power supply (max. allowed sink current = 25mA at a saturation voltage of $<0.4V$). The output is connected through a pull-up resistor of 1.8kOhm to the plus pole of the power supply
Frequency range	5Hz...20 kHz
Electromagnetic compatibility (EMC)	- Electrostatic discharge onto housing, cable shield and wires: up to ± 4 kV peak according to IEC 61000-4-2, severity level 2 - Radiated electromagnetic field: up to 30 V/m, 50% AM, 1kHz in the range of 1 MHz to 1000 MHz according to IEC 61000-4-3, severity level 3 - Electrical fast transients/bursts, coupled to sensor cable with a capacitive coupling clamp: up to ± 4 kV peak according to IEC 6100-4-4, severity level 4
Insulation	Housing and electronics galvanically separated (500 V/50 Hz/ 1 Min.)
Operating temperature	-40/+125°C for non Ex version, for Ex version see Ex related information.
Housing	Argentan (German silver) CuNi10Zn42Pb DIN 2.0770, front side hermetically sealed, sensor components potted in chemical and age proof synthetic resin. Dimensions according to drawing.

Protection	IP68 (head) IP67 (connection)						
Vibration immunity	3 g in the range 4...100 Hz						
Shock immunity	20 g during 11 ms, half-sine wave						
Weight	see type list						
Pole wheel	Ferromagnetic toothed wheel (eg. USt 37-2), involute gear wheel preferred, module ≥ 0.5, minimum tooth width 3mm, side offset $< 0.2\text{mm}$, eccentricity $< 0.2\text{mm}$ Pole wheel - sensor gap with <table> <tr> <td>Module 0.5:</td><td>0.1...1.4 mm</td></tr> <tr> <td>Module 1.0:</td><td>0.1...1.0 mm</td></tr> <tr> <td>$\geq$ Module 2.0:</td><td>0.1...1.3 mm</td></tr> </table>	Module 0.5:	0.1...1.4 mm	Module 1.0:	0.1...1.0 mm	$\geq$ Module 2.0:	0.1...1.3 mm
Module 0.5:	0.1...1.4 mm						
Module 1.0:	0.1...1.0 mm						
$\geq$ Module 2.0:	0.1...1.3 mm						
Connection	Type A: Teflon insulated wires, length 40 cm, 0.22 mm² (AWG 24) Type B: Molex-plug, Type 03-06-2031, Part-No. 343C-72577						
Mounting	These sensors contain a differential hall sensor. Therefore it is necessary that the housing is positioned according to the dimensional drawing below. If this condition is not complied with it is possible that the sensor will not work correctly.						
Ex-Safety	For explosion proof versions II 1G and II1D a copy of the European Certificate of Conformity ZELM 00 ATEX 0147X is attached. See also below, the Ex related information in this documentation .						
Installation	For installation, the CE directives for the installation of apparatus in explosive environments must be taken into consideration.						
Marking Acc. to Directive 94/9/EC	CE 0820  II 1 G II 1 D						
Electrical Data	U ₀ =10V, I _s =204mA, P=510mW						
Maintenance	No maintenance. The sensors cannot be repaired.						

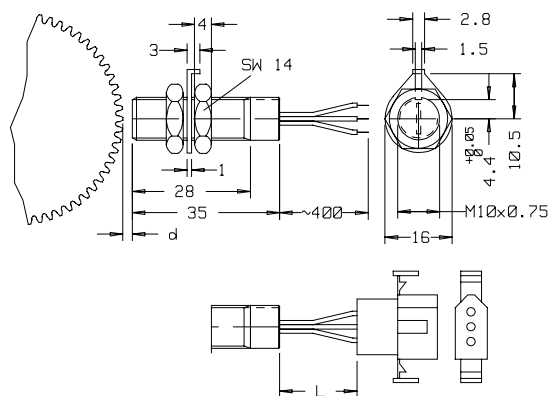
Type-list:

Type	Part.No.	Connection	Cable type	Cable length L	Weight
FTG 1088.00	343Z-03828	Type A	lace open	400 mm	20 gr
FTG 1088.01	343Z-03835	Type B	lace twisted	(with plug) 105 mm	23 gr
FTG 1088.00 Ex	343Z-03772	Type A	lace open	400 mm	20 gr
FTG 1088.01 Ex	343Z-03770	Type B	lace twisted	(with plug) 105 mm	23 gr
FTG 1088.01 S4 Ex	343Z-03834	Type A	Lace open	5m cable	100 gr

Schema:



Dimensional drawing:



CE-Declaration of Conformity

According to the CE guidelines

- Electromagnetic compatibility 89/336/EEG
- Apparatus used in explosive environment 94/4/EEG

The apparatus

Type name : FTG 1088.xx and FTG 1089.xx

Have been developed, and are constructed and produced in accordance with the guidelines 89/336/EEG and 94/4/EEG solely by :

Company : JAQUET AG, Thannerstrasse 15, CH-4009 Schweiz.

The following harmonised standards are applicable :

- EN 50081-2, EN 50011, CISPR 16
- EN 50082-2, EN 61000-4-2/3/4/5/6/8/11
- EN 50014
- EN 50020
- EN 50284
- EN 1127
- EN ISO 9001:2000

The following national standards are applicable :

- IEC 60068-2-1/2/30/6
- VDE 0165

Full technical documentation is available.

The associated instruction manuals are available under following numbers :

- 343D-63725 for FTG 1088.xx in original language.
- 343D-63726 for FTG 1089.xx in original language.

Basel, the 28.11.2002

Signature



Head of engineering



Prüf- und Zertifizierungsstelle

ZELM Ex



(1) **EC-TYPE-EXAMINATION CERTIFICATE**

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**

(3) EC-TYPE-EXAMINATION CERTIFICATE Number:

ZELM 03 ATEX 0147X

(4) Equipment: **Rotation speed sensor type FTG 1088... Ex und Typ FTG 1089... Ex**

(5) Manufacturer: **JAQUET AG**

(6) Address: **Thannerstrasse 15, CH-4009 Basel**

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The Prüf- und Zertifizierungsstelle ZELM Ex, notified body No. 0820 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential report ZELM Ex 0040315194.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

**EN 50 014: 1997+A1+A2
prEN 61241-0: 2002**

**EN 50020: 1994
31H/143/CD (IEC 61241-11): 2002**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type-examination Certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this Certificate.

(12) The marking of the equipment shall include the following:



II 1 G EEx ia IIC T6 und II 1 D Ex iaD 20 T ...°C

Zertifizierungsstelle **ZELM Ex**


Adolf Gruber



Braunschweig, June 19, 2003

Sheet 1/3

EC-type-examination Certificates without signature and stamp are not valid. The certificates may only be circulated without alteration. Extracts or alterations are subject to approval by the Prüf- und Zertifizierungsstelle ZELM Ex. This English version is based on the German text. In the case of dispute, the German text shall prevail.

Prüf- und Zertifizierungsstelle ZELM Ex • Siekgraben 56 • D-38124 Braunschweig



SCHEDULE

(13)

(14) **EC-TYPE-EXAMINATION CERTIFICATE ZELM 03 ATEX 0147X**

(15) Description of equipment

The rotation speed sensors are used for the recording of the rotation speed for the touchless scanning of rotating ferromagnetic rotating magnetic poles, gears, camshafts and the like.

Model key:

type	Cable type	Cable length	Remarks
FTG 1088.00 Ex FTG 1089.00 Ex	Single laces	400 mm	
FTG 1088.01 Ex FTG 1089.01 Ex	Single laces - twisted	105 mm	with connection plug
FTG 1088.01 S4 Ex FTG 1089.01 S4 Ex	3-wire shielded teflon cord	max. 5 m	

The types FTG 1088... and FTG 1089... distinguish through the inner construction and the functional behavior. These differences are however for security reasons without importance.

Electrical data

Supply- and signal circuit type of protection intrinsic safety EEx ia IIC resp. ia IIB or iaD for use according to category 1D

only for the connection to certified intrinsically safe circuits

maximum values: $U_i = 10 \text{ V}$
 $I_i = 204 \text{ mA}$
 $P_i = 510 \text{ mW}$ resp. 200 mW

Maximum effective inner capacity $C_i = 9 \text{ nF}$

The maximum effective inner inductance is negligibly small

The lower temperature boundary is for all versions and applications - 20 °C.

The temperature class resp. the maximum surface temperature, the maximum permissible ambient temperature and the maximal permissible power of the connected, certified, intrinsically safe circuit (P_i) for the different versions are to take from the tables 1 resp. 2.

Table 1

Category	P_i [mW]	maximum ambient temperature for the temperature classes in °C					
		T1	T2	T3	T4	T5	T6
2G	510	100	100	100	100	70	55
	200	100	100	100	100	85	70
1G	510	100	100	100	80	50	40
	200	100	100	100	95	65	55

Sheet 2/3

EC-type-examination Certificates without signature and stamp are not valid. The certificates may only be circulated without alteration. Extracts or alterations are subject to approval by the Prüf- und Zertifizierungsstelle ZELM Ex. This English version is based on the German text. In the case of dispute, the German text shall prevail.

Prüf- und Zertifizierungsstelle ZELM Ex • Siekgraben 56 • D-38124 Braunschweig



Schedule to EC-TYPE-EXAMINATION CERTIFICATE ZELM 03 ATEX 0147X

Table 2

Category	P _i [mW]	maximum ambient temperature	maximum surface temperature
1D	510	100 °C	155 °C
	200	100 °C	125 °C

(16) Report No.

ZELM Ex 0040315194

(17) Special conditions for safe use

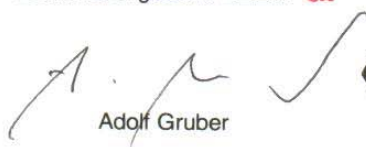
1. The Rotation Speed Sensors may be used only in intrinsically safe electric circuits in accordance with the information in this EC-type-examination certificate. Because of possible ignition hazards, which can arise due to mistakes and/or transient currents in the potential equalization system galvanic separation is to be favored in the supply- and signal circuit. Associated apparatus without galvanic separation may be used only if the corresponding requirements are kept according to IEC 60079-14.
2. The permissible ambient temperature range is to be determined according to the determination of this EC-type-examination certificate.
3. The versions with plug adapter resp. with single laces are only intended for mounting in an appropriate enclosure, which assure an adequate protection corresponding the environmental conditions and allowed the proper electric connection. The supply cable of the corresponding version is to protect against mechanical hazards and against electrostatic charge where appropriate by correct installation.
4. The metal case of the rotation speed sensors is to be included in the local potential equalization as far as dangerous electrostatic charge for example through flowing media or mechanical friction must be reckoned on.
5. The tightness for the purposes of zone separating measures for the mounting across the boundary between different zones is not subject of this certification and must be ensured by appropriate measures of installation.
6. The instruction manual has to be considered.

(18) Essential Health and Safety Requirements

Met by standards. The rotation speed sensors correspond with the norms EN 50014 and EN 50020. For the commitment 1 D the performed draft standards were used besides since no harmonized European standards that are to be applied in connection with the type of protection "Intrinsic safety" are available in the moment.

Zertifizierungsstelle ZELM Ex

Braunschweig, June 19, 2003


Adolf Gruber



Sheet 3/3

EC-type-examination Certificates without signature and stamp are not valid. The certificates may only be circulated without alteration. Extracts or alterations are subject to approval by the Prüf- und Zertifizierungsstelle ZELM Ex. This English version is based on the German text. In the case of dispute, the German text shall prevail.

Prüf- und Zertifizierungsstelle ZELM Ex • Siekgraben 56 • D-38124 Braunschweig